

**CHI MEI**  
OPTOELECTRONICS CORP.

Issued Date: Feb. 13, 2009

Model No.: V400H1-PH1

**Approval**

## TFT LCD Control Board Approval Specification

**MODEL NO.: V400H1-PH1****Part NO.: 35-D032699**

Customer: \_\_\_\_\_

Approved by: \_\_\_\_\_

Note:

|             |         |  |
|-------------|---------|--|
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|             | LY Chen |  |

|             |           |                          |
|-------------|-----------|--------------------------|
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**Approval****REVISION HISTORY**

| Version | Date         | Page (New) | Section | Description                               |
|---------|--------------|------------|---------|---|
| Ver 1.0 | Feb.13, 2009 | All        | All     | Approval; Specification was first issued. |

## 1. GENERAL DESCRIPTION

### 1.1 OVERVIEW

This control board supports 2 channel LVDS input and PPRSDS output for V400H1-PH1 module. It can use for 1920 x 1080 HDTV format and can display true 1.073G colors (10bit/color).

### 1.2 CHARACTERISTICS

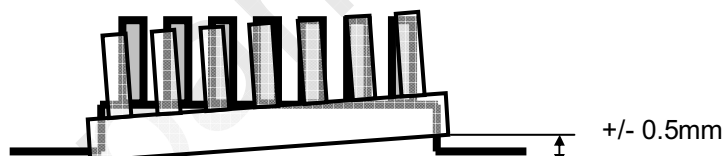
| CHARACTERISTICS ITEMS | SPECIFICATIONS    |
|-----------------------|-------------------|
| Frame Rate            | 50Hz / 60Hz       |
| Resolution            | 1920*1080         |
| Weight [g]            | TYP. (ME)         |
| Physical Size [mm]    | Typ. (ME)         |
| Sync Mode             | H_sync and V_sync |

### 1.3 MECHANICAL SPECIFICATIONS (ME)

| Item                            | Min.   | Typ. | Max. | Unit | Note |
|---------------------------------|--|------|------|------|------|
| Weight                          | 2260   | 2560 | 2860 | g    | -    |
| I/F connector mounting position | The mounting inclination of the connector makes the screen center within $\pm 0.5\text{mm}$ as the horizontal. |      |      |      | (2)  |

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

(2) Connector mounting position



## 2. ABSOLUTE MAXIMUM RATINGS

### 2.1 ABSOLUTE RATINGS OF ENVIRONMENT (BASED ON CMO MODULE V400H1-PH1)

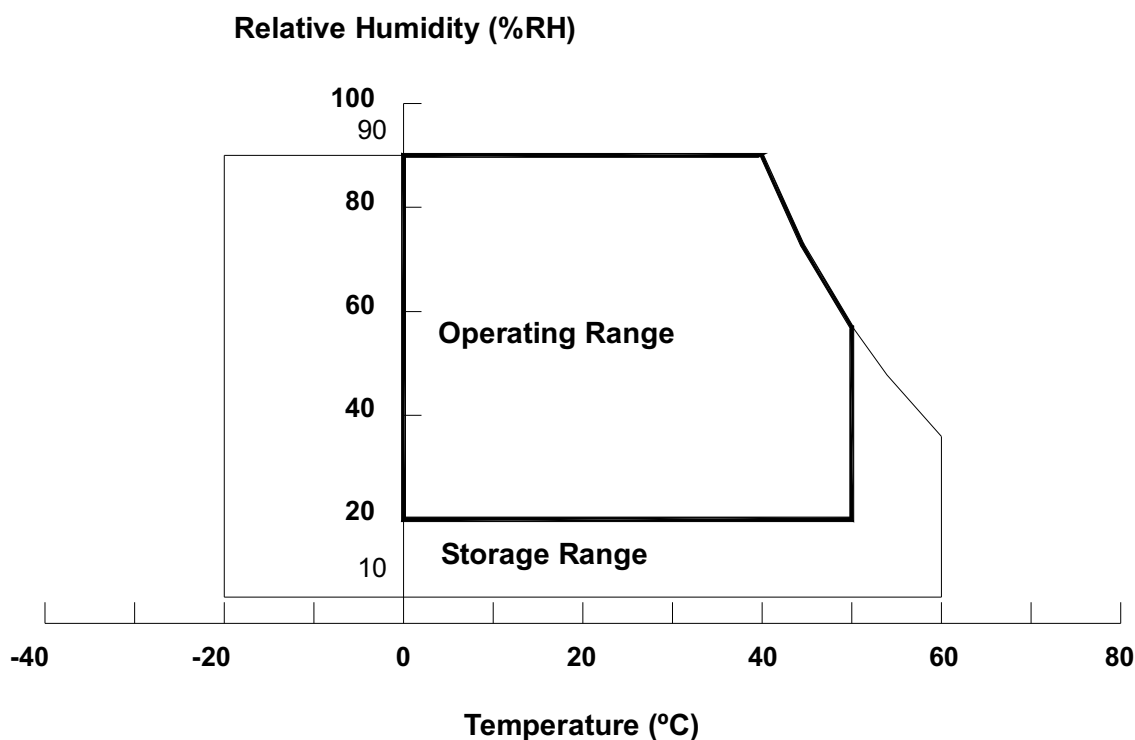
| Item                          | Symbol          | Value |       | Unit | Note          |
|-------------------------------|-----------------|-------|-------|------|---------------|
|                               |                 | Min.  | Max.  |      |               |
| Storage Temperature           | T <sub>ST</sub> | -20   | +60   | °C   | (1), (3)      |
| Operating Ambient Temperature | T <sub>OP</sub> | 0     | 50    | °C   | (1), (2), (3) |
| Altitude Operating            | A <sub>OP</sub> | 0     | 5000  | M    | (3)           |
| Altitude Storage              | A <sub>ST</sub> | 0     | 12000 | M    | (3)           |

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. ( $T_a \leq 40\text{ }^{\circ}\text{C}$ ).

(b) Wet-bulb temperature should be 39 °C Max. ( $T_a > 40\text{ }^{\circ}\text{C}$ ).

(c) No condensation..



Note (2) The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 65 °C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in your product design to prevent the surface temperature of display area from being over 65 °C. The range of operating temperature may degrade in case of improper thermal management in your product design.

Note (3) The rating of environment is base on LCD module. Leave LCD cell alone, this environment condition can'tbe guaranteed. Except LCD cell, the customer has to consider the ability of other parts of LCD module and LCD module process.



## 2.2 ABSOLUTE RATINGS OF ENVIRONMENT (OPEN CELL)

Storage Condition : With shipping package.

Storage temperature range :  $25\pm 5\text{ }^{\circ}\text{C}$

Storage humidity range :  $50\pm 10\%\text{RH}$

Shelf life : a month

## 2.3 ELECTRICAL ABSOLUTE RATINGS (OPEN CELL)

| Item                 | Symbol          | Value |      | Unit | Note |
|----------------------|-----------------|-------|------|------|------|
|                      |                 | Min.  | Max. |      |      |
| Power Supply Voltage | V <sub>CC</sub> | -0.3  | 13.5 | V    | (1)  |
| Input Signal Voltage | V <sub>IN</sub> | -0.3  | 3.6  | V    |      |

### 3. ELECTRICAL CHARACTERISTICS

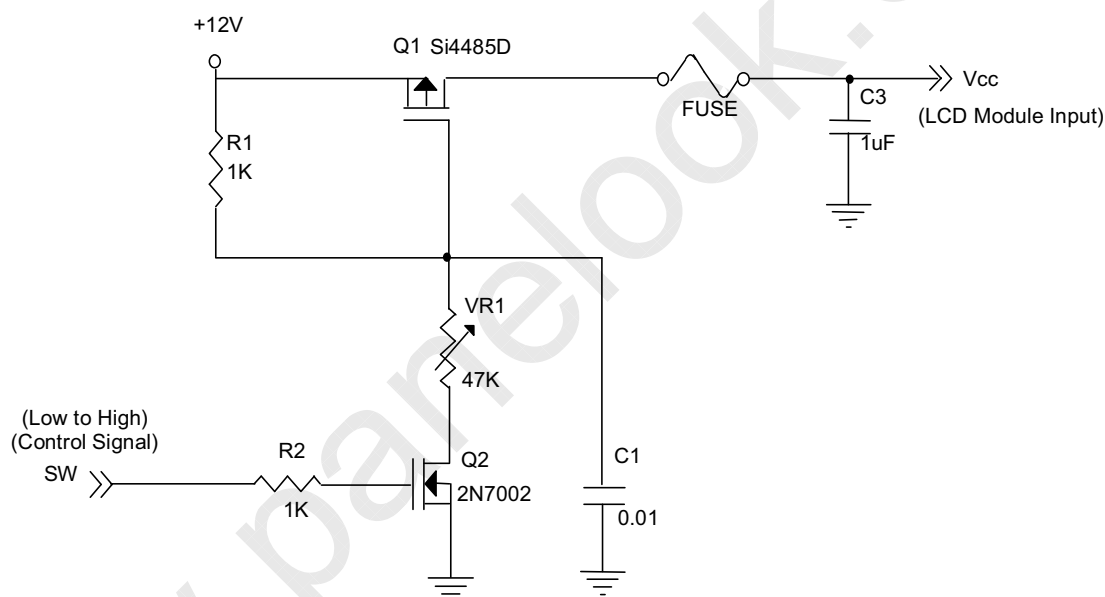
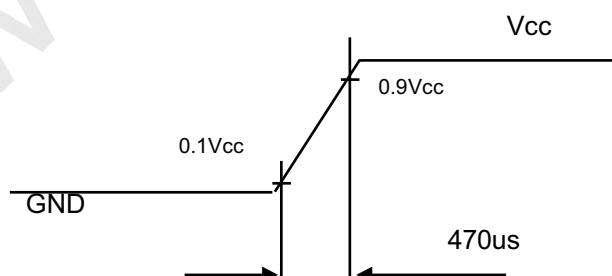
#### 3.1 TFT LCD MODULE

Ta = 25 ± 2 °C

| Parameter                   |                              | Symbol            | Value |      |       | Unit | Note |
|-----------------------------|------------------------------|-------------------|-------|------|-------|------|------|
|                             |                              |                   | Min.  | Typ. | Max.  |      |      |
| Power Supply Voltage        |                              | V <sub>CC</sub>   | 10.8  | 12.0 | 13.2  | V    | (1)  |
| Power Supply Ripple Voltage |                              | V <sub>RP</sub>   | -     | -    | 350   | mV   |      |
| Rush Current                |                              | I <sub>RUSH</sub> | -     | -    | 4.5   | A    | (2)  |
| Power Supply Current        | White                        | I <sub>CC</sub>   | -     | 2.6  | 2.9   | A    | (3)  |
|                             | Black                        |                   | -     | 2    |       | A    |      |
|                             | Vertical Stripe              |                   | -     | 2.6  |       | A    |      |
| LVDS Interface              | Common Input Voltage         | V <sub>LVC</sub>  | 1.125 | 1.25 | 1.375 | V    |      |
|                             | Terminating Resistor         | R <sub>T</sub>    | -     | 100  | -     | ohm  |      |
| CMOS interface              | Input High Threshold Voltage | V <sub>IH</sub>   | 2.7   | -    | 3.3   | V    |      |
|                             | Input Low Threshold Voltage  | V <sub>IL</sub>   | 0     | -    | 0.7   | V    |      |

Note (1) The module should be always operated within above ranges.

Note (2) Measurement Conditions: (Base on V400H1-PH1 module)

**Vcc rising time is 470us**

Note (3) The specified power supply current is under the conditions at V<sub>CC</sub> = 12V, Ta = 25 ± 2 °C, f<sub>v</sub> = 60 Hz, whereas a power dissipation check pattern below is displayed.

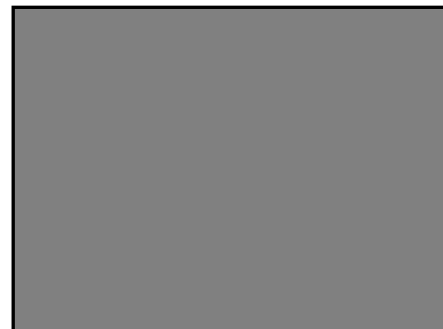
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a. White Pattern



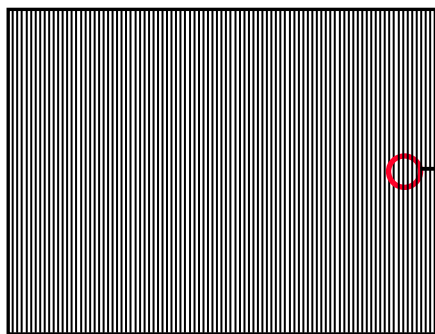
Active Area

b. Black Pattern

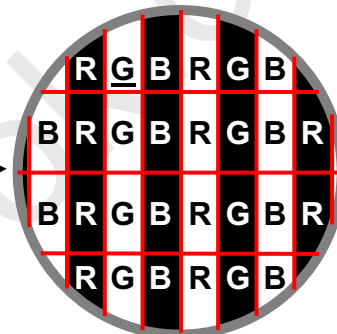


Active Area

c. Vertical Stripe Pattern



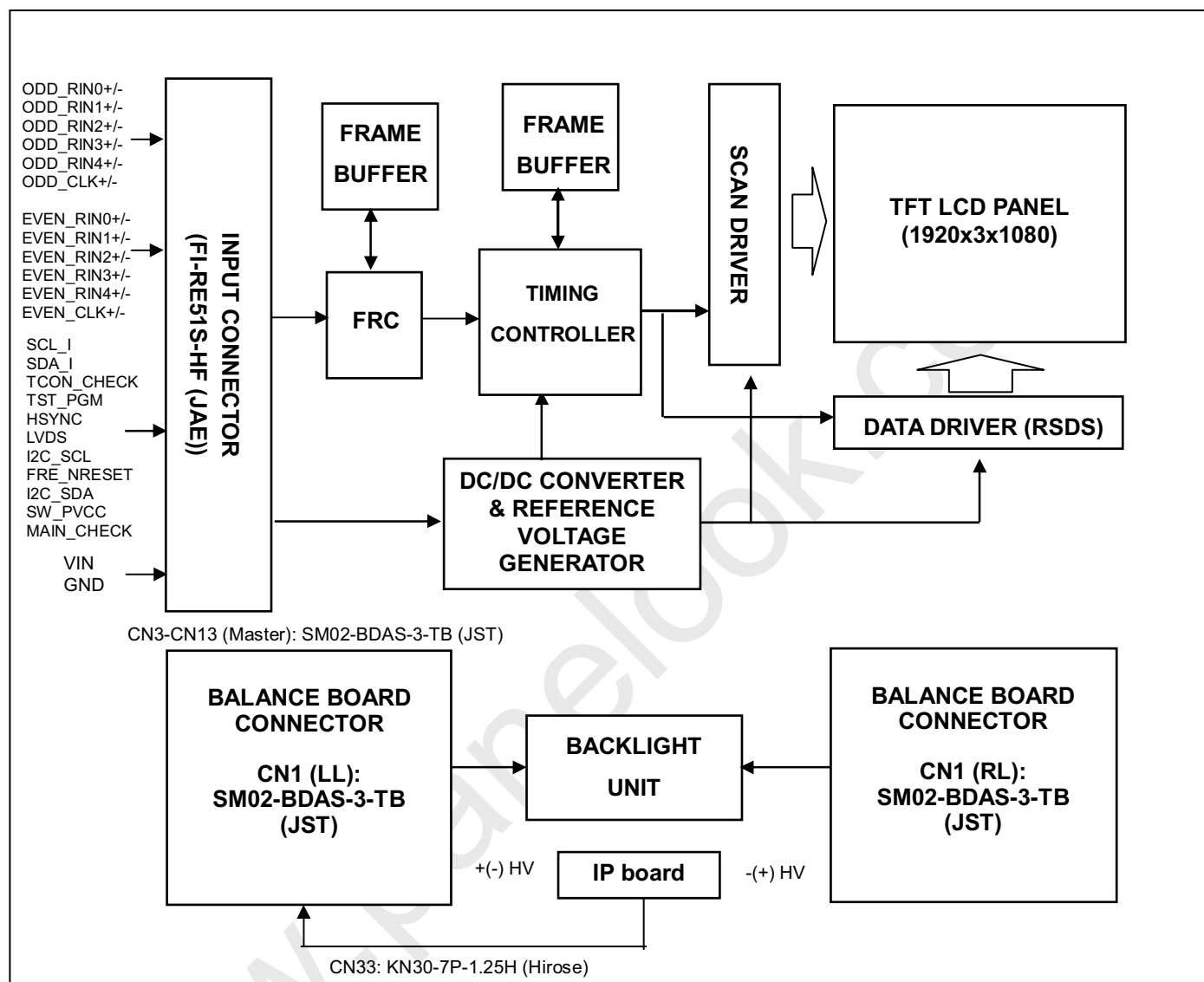
Active Area





## 4. BLOCK DIAGRAM

### 4.1 TFT LCD MODULE





## 5. INPUT TERMINAL PIN ASSIGNMENT

### 5.1 TFT LCD Module Input

#### CN505 Connector Pin Assignment

| Pin No. | Symbol       | Description                                  |
|---------|--------------|--|
| 1       | VIN          | +12.0V power supply                          |
| 2       | VIN          | +12.0V power supply                          |
| 3       | VIN          | +12.0V power supply                          |
| 4       | VIN          | +12.0V power supply                          |
| 5       | VIN          | +12.0V power supply                          |
| 6       | NC           | No connection                                |
| 7       | GND          | Ground                                       |
| 8       | GND          | Ground                                       |
| 9       | GND          | Ground                                       |
| 10      | ODD_RIN0N    | Negative transmission data of First pixel 0  |
| 11      | ODD_RIN0P    | Positive transmission data of First pixel 0  |
| 12      | ODD_RIN1N    | Negative transmission data of First pixel 1  |
| 13      | ODD_RIN1P    | Positive transmission data of First pixel 1  |
| 14      | ODD_RIN2N    | Negative transmission data of First pixel 2  |
| 15      | ODD_RIN2P    | Positive transmission data of First pixel 2  |
| 16      | GND          | Ground                                       |
| 17      | ODD_RINCLKN  | Negative of First clock                      |
| 18      | ODD_RINCLKP  | Positive of First clock                      |
| 19      | GND          | Ground                                       |
| 20      | ODD_RIN3N    | Negative transmission data of First pixel 3  |
| 21      | ODD_RIN3P    | Positive transmission data of First pixel 3  |
| 22      | ODD_RIN4N    | Negative transmission data of First pixel 4  |
| 23      | ODD_RIN4P    | Positive transmission data of First pixel 4  |
| 24      | GND          | Ground                                       |
| 25      | EVEN_RIN0N   | Negative transmission data of Second pixel 0 |
| 26      | EVEN_RIN0P   | Positive transmission data of Second pixel 0 |
| 27      | EVEN_RIN1N   | Negative transmission data of Second pixel 1 |
| 28      | EVEN_RIN1P   | Positive transmission data of Second pixel 1 |
| 29      | EVEN_RIN2N   | Negative transmission data of Second pixel 2 |
| 30      | EVEN_RIN2P   | Positive transmission data of Second pixel 2 |
| 31      | GND          | Ground                                       |
| 32      | EVEN_RINCLKN | Negative of Second clock                     |
| 33      | EVEN_RINCLKP | Positive of Second clock                     |
| 34      | GND          | Ground                                       |
| 35      | EVEN_RIN3N   | Negative transmission data of Second pixel 3 |
| 36      | EVEN_RIN3P   | Positive transmission data of Second pixel 3 |
| 37      | EVEN_RIN4N   | Negative transmission data of Second pixel 4 |
| 38      | EVEN_RIN4P   | Positive transmission data of Second pixel 4 |
| 39      | GND          | Ground                                       |
| 40      | SCL_I        | SEC define                                   |

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|    |            |               |
|----|------------|---------------|
| 41 | SDA_I      | SEC define    |
| 42 | TCON_CHECK | SEC define    |
| 43 | TST_PGM    | SEC define    |
| 44 | HSYNC      | SEC define    |
| 45 | LVDS_SEL   | SEC define    |
| 46 | I2C_SCL    | SEC define    |
| 47 | FRC_NRESET | SEC define    |
| 48 | I2C_SDA    | SEC define    |
| 49 | SW_PVCC    | SEC define    |
| 50 | MAIN_CHECK | SEC define    |
| 51 | NC         | No connection |

Note (1) CN505 Connector Part No.: JAE Taiwan (台灣航空電子) FI-RE51S-HF or equal.



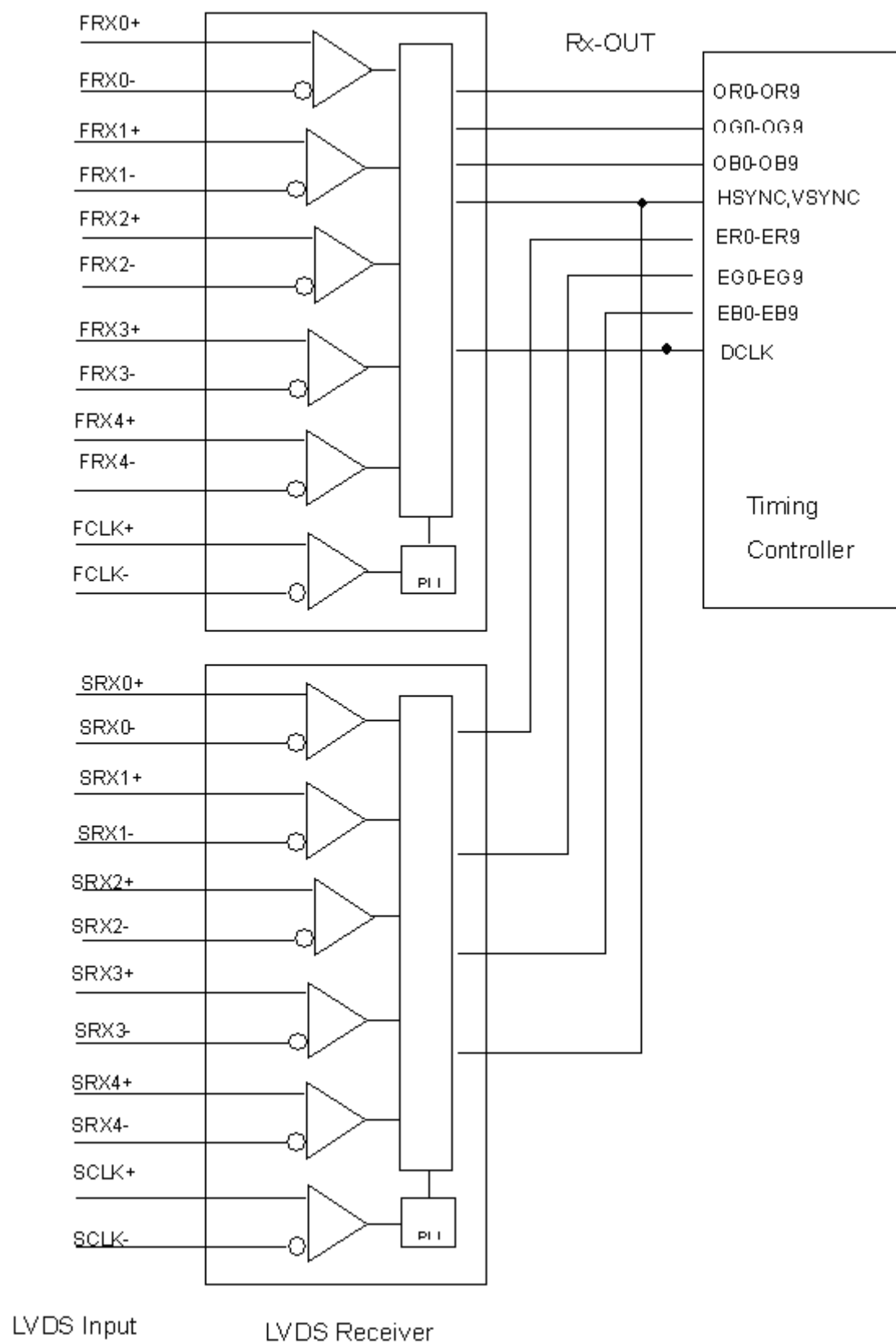
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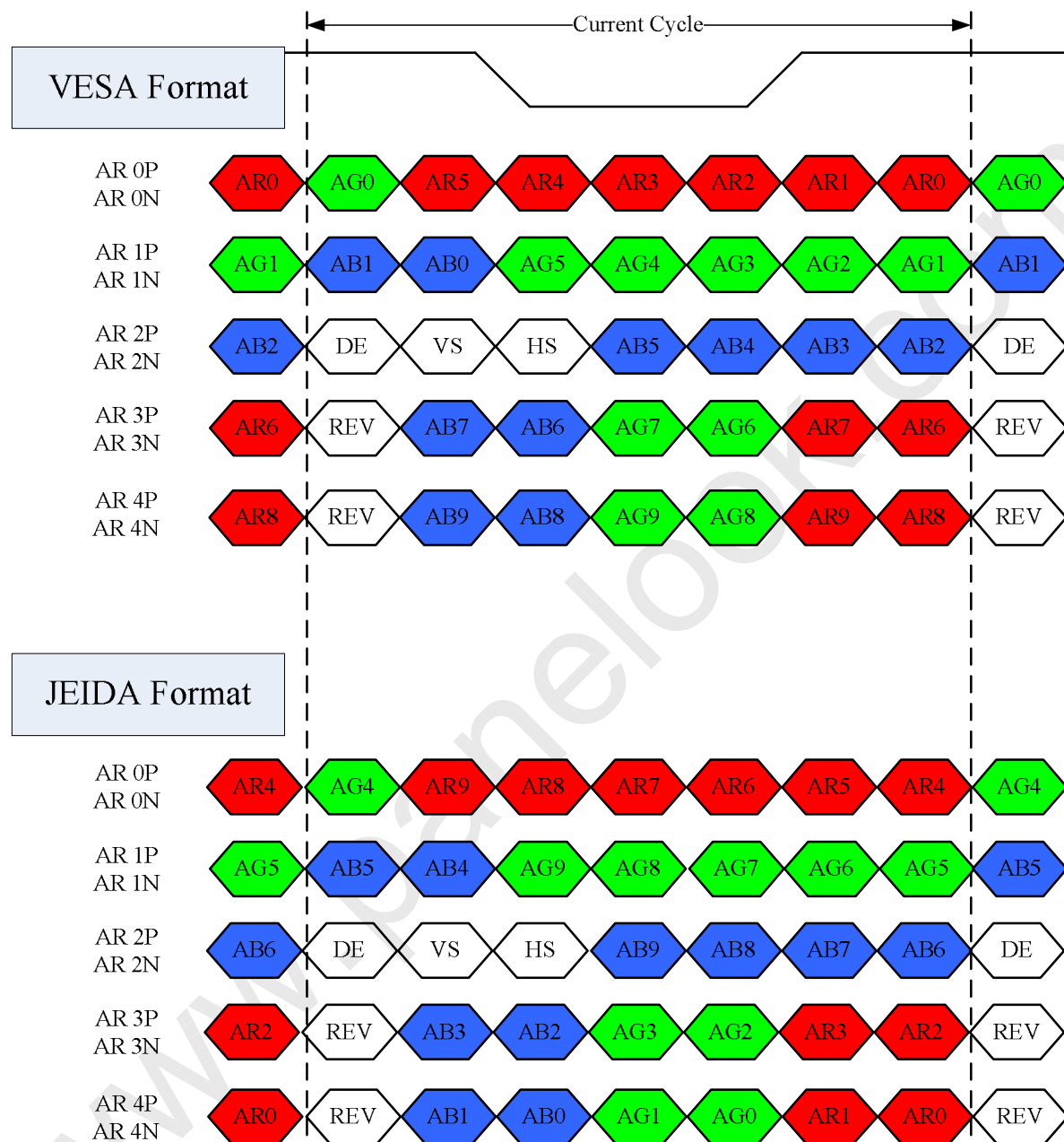
## 5.2 BLOCK DIAGRAM OF INTERFACE



### 5.3 LVDS INTERFACE

VESA Format : SELLVDS = H or Open

JEIDA Format : SELLVDS = L



AR0~AR9: First Pixel R Data (9; MSB, 0; LSB)

AG0~AG9: First Pixel G Data (9; MSB, 0; LSB)

AB0~AB9: First Pixel B Data (9; MSB, 0; LSB)

DE : Data enable signal

DCLK : Data clock signal

RSVD : Reserved

## 5.4 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 10-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

| Color               |                  | Data Signal |    |    |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |    |    |      |    |    |    |    |    |    |    |   |  |
|---------------------|------------------|-------------|----|----|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|----|----|------|----|----|----|----|----|----|----|---|--|
|                     |                  | Red         |    |    |    |    |    |    |    |    |    | Green |    |    |    |    |    |    |    |    |    | Blue |    |    |    |    |    |    |    |   |  |
|                     |                  |             |    |    |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |    |    |      |    |    |    |    |    |    |    |   |  |
| R9                  | R8               | R7          | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G9 | G8 | G7    | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B9 | B8 | B7   | B6 | B5 | B4 | B3 | B2 | B1 | B0 |   |  |
| Basic Colors        | Black            | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Red              | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Green            | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Blue             | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1 |  |
|                     | Cyan             | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1 |  |
|                     | Magenta          | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1 |  |
|                     | Yellow           | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
| White               | 1                | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  |   |  |
| Gray Scale Of Red   | Red (0) / Dark   | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Red (1)          | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Red (2)          | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | :                | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | : |  |
|                     | :                | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | : |  |
|                     | Red (1021)       | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Red (1022)       | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
| Red (1023)          | 1                | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |  |
| Gray Scale Of Green | Green (0) / Dark | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Green (1)        | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Green (2)        | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | :                | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | : |  |
|                     | :                | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | : |  |
|                     | Green (1021)     | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Green (1022)     | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
| Green (1023)        | 0                | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |  |
| Gray Scale Of Blue  | Blue (0) / Dark  | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 |  |
|                     | Blue (1)         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1 |  |
|                     | Blue (2)         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0 |  |
|                     | :                | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | : |  |
|                     | :                | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | : |  |
|                     | Blue (1021)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1 |  |
|                     | Blue (1022)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0 |  |
| Blue (1023)         | 0                | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  | 1  |   |  |

Note (1) 0: Low Level Voltage, 1: High Level Voltage

## 6. INTERFACE TIMING

### 6.1 INPUT SIGNAL TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

| Signal                         | Item       | Symbol | Min. | Typ.  | Max. | Unit | Note       |
|--------------------------------|------------|--------|------|-------|------|------|------------|
| LVDS Receiver Clock            | Frequency  | 1/Tc   | -    | 74    | -    | MHZ  |            |
| Hsync                          |            | Fh     | -    | 67.5  | -    | KHz  |            |
| Vsync                          |            | Fv     | -    | 59.94 | -    | Hz   |            |
| LVDS Receiver Data             | Setup Time | Tlvsu  | 600  | -     | -    | ps   |            |
|                                | Hold Time  | Tlvhd  | 600  | -     | -    | ps   |            |
| Vertical Active Display Term   | Frame Rate | Fr6    | 57   | 60    | 63   | Hz   |            |
|                                | Total      | Tv     | -    | 1125  | -    | Th   | Tv=Tvd+Tvb |
|                                | Display    | Tvd    | -    | 1080  | -    | Th   | -          |
|                                | Blank      | Tvb    | -    | 45    | -    | Th   | -          |
| Horizontal Active Display Term | Total      | Th     | -    | 2200  | -    | Tc   | Th=Thd+Thb |
|                                | Display    | Thd    | -    | 1920  | -    | Tc   | -          |
|                                | Blank      | Thb    | -    | 280   | -    | Tc   | -          |

Note: Since this control board is operated in Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this module would operate abnormally.

### 6.2 INTERNAL SIGNAL TIMING SPECIFICATIONS (FRC→ T-CON)

The input signal timing specifications are shown as the following table and timing diagram.

| Signal                         | Item       | Symbol | Min. | Typ. | Max. | Unit | Note       |
|--------------------------------|------------|--------|------|------|------|------|------------|
| LVDS Receiver Clock            | Frequency  | 1/Tc   | 60   | 74   | 80   | MHZ  | (1)        |
| Hsync                          |            | Fh     | -    | 135  | -    | KHz  |            |
| Vsync                          |            | Fv     | -    | 120  | -    | Hz   |            |
| LVDS Receiver Data             | Setup Time | Tlvsu  | 600  | -    | -    | ps   |            |
|                                | Hold Time  | Tlvhd  | 600  | -    | -    | ps   |            |
| Vertical Active Display Term   | Frame Rate | Fr6    | -    | 120  | -    | Hz   |            |
|                                | Total      | Tv     | 1115 | 1125 | 1410 | Th   | Tv=Tvd+Tvb |
|                                | Display    | Tvd    | 1080 | 1080 | 1080 | Th   | -          |
|                                | Blank      | Tvb    | 35   | 45   | 330  | Th   | -          |
| Horizontal Active Display Term | Total      | Th     | 540  | 550  | 663  | Tc   | Th=Thd+Thb |
|                                | Display    | Thd    | 480  | 480  | 480  | Tc   | -          |
|                                | Blank      | Thb    | 60   | 70   | 183  | Tc   | -          |

Note : Since the module is operated in DE only mode, and Hsync and Vsync input signals should be set to low logic level. Otherwise, this module would operate abnormally.

Note (1) LVDS Clock should not over 80MHz even if H-total or V-total is in spec, and the frequency follows the equation below.

Note (2) LVDS CLK= Frame rate \* H-total \* V-total



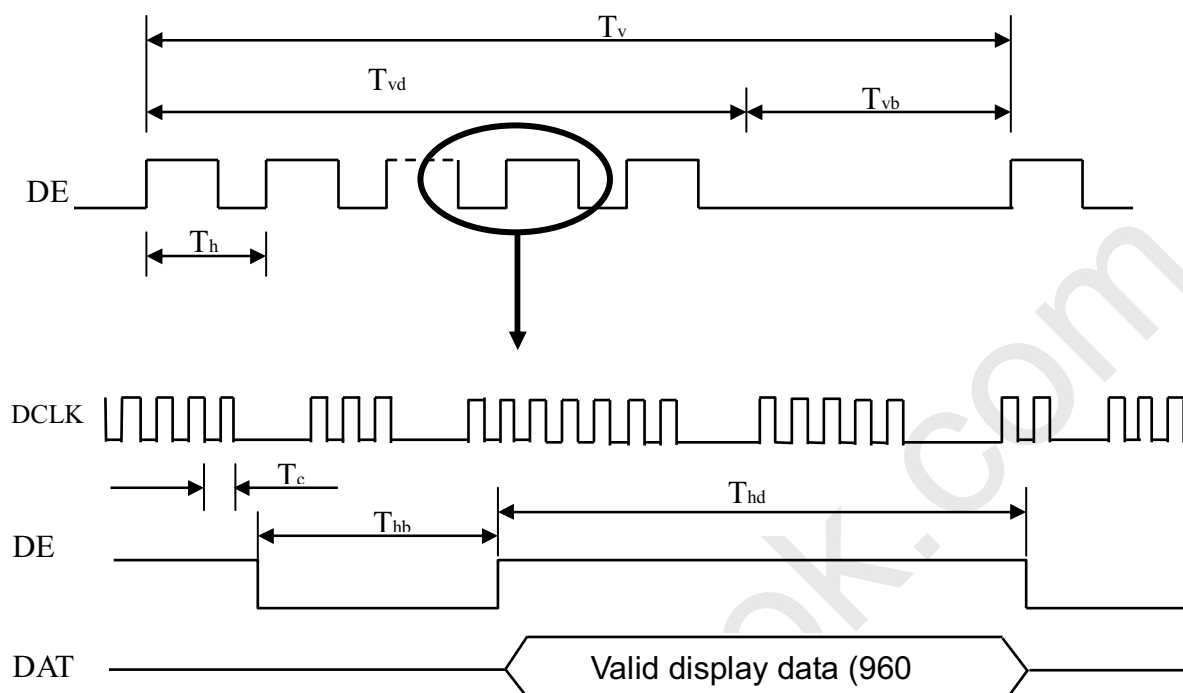
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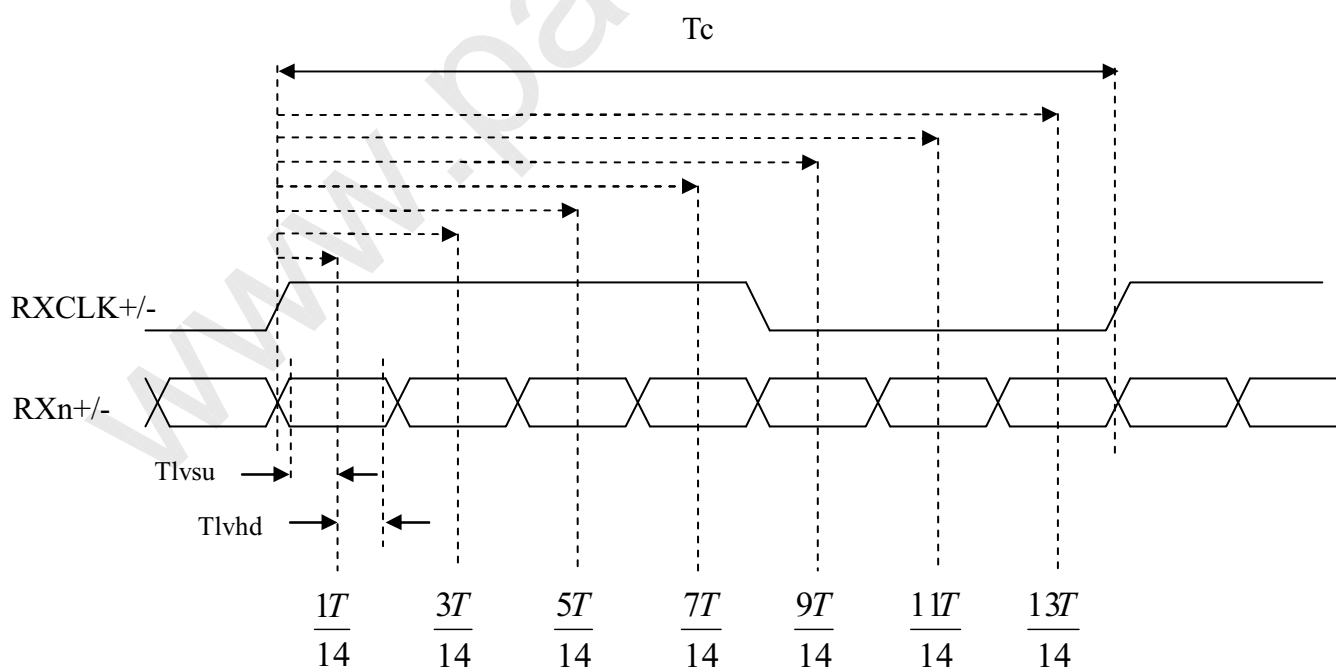
Model No.: V400H1-PH1

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### INPUT SIGNAL TIMING DIAGRAM



### LVDS RECEIVER INTERFACE TIMING DIAGRAM






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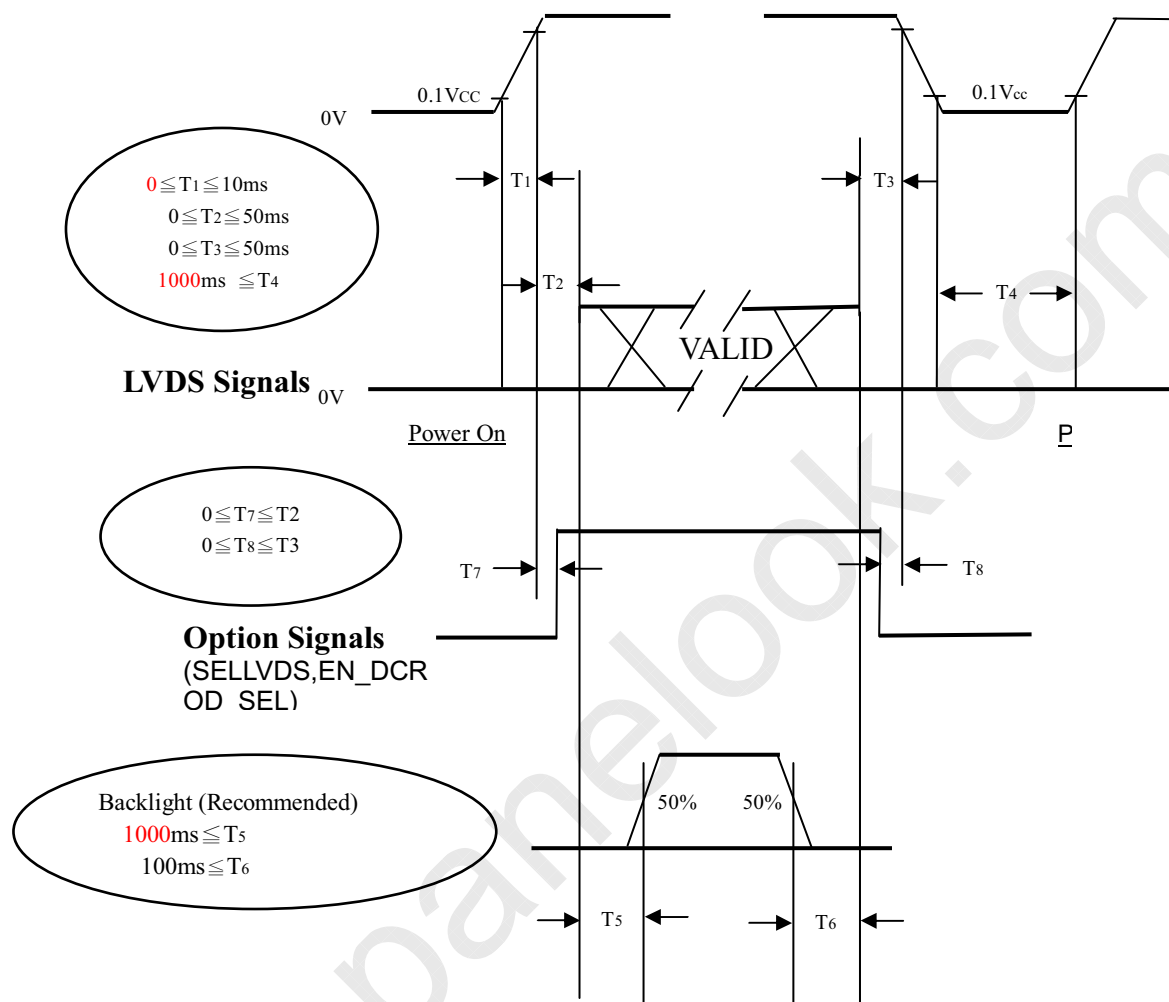
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## 6.2 POWER ON/OFF SEQUENCE

 $(T_a = 25 \pm 2\text{ }^{\circ}\text{C})$ 

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should be as the diagram below.



Power ON/OFF Sequence

Note (1) The supply voltage of the external system for the module input should follow the definition of  $V_{cc}$ .

Note (2) Apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.

Note (3) In case of  $V_{cc}$  is in off level, please keep the level of input signals on the low or high impedance. If  $T_2 < 0$ , that maybe cause electrical overstress failure.

Note (4)  $T_4$  should be measured after the module has been fully discharged between power off and on period.

Note (5) Interface signal shall not be kept at high impedance when the power is on.

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## 7. Mechanical Drawing

